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## On the Lava Fields of Rangitoto\*

MARGUERITE CROOKES

Surrounding the areas and "islands" of vegetation on Rangitoto Island, New Zealand, one encounters masses of black lava, treacherous to scramble over and ugly to behold. But a promising spot indeed is this "cinder heap" for a fern hunter. One would expect a few rock ferns and some of the hardy and ubiquitous species that range throughout the country, but little else. But actually on this unique volcanic island the most remarkable feature of a remarkable vegetation is the unexpected richness and variety of its fern flora, and the greatest surprise of all is the great quantity of filmy ferns (species of Hymenophyllaceae) which one associates with the shady forests and deep valleys of the mainland.

Exploring the islands one will find growing on them, right out on to the open lava, huge masses of Kidney Fern, *Cardiomanes reniforme* (Forster) Presl, with its beautiful clear green kidney-shaped fronds, fringed when fertile with tiny bright brown columns of sporangia. The kidney fern is also found completely covering the floor and rocky sides of small gullies where the lava has consolidated. Along with it is found in many places an abundance of Piri Piri, *Mecodium sanguinolentum* (Forst.) Presl, sometimes called the Scented Filmy fern because it scents the paper when drying. I well remember the astonishment of the late Sir Arthur Hill, Director of Kew, when he saw these exquisite delicate "filmies" flourishing on the open lava. "Good Heavens," he exclaimed, "Why at Kew we grow those things under three layers of glass!" Nor are the filmies confined to these two species. One sometimes meets with the handsome

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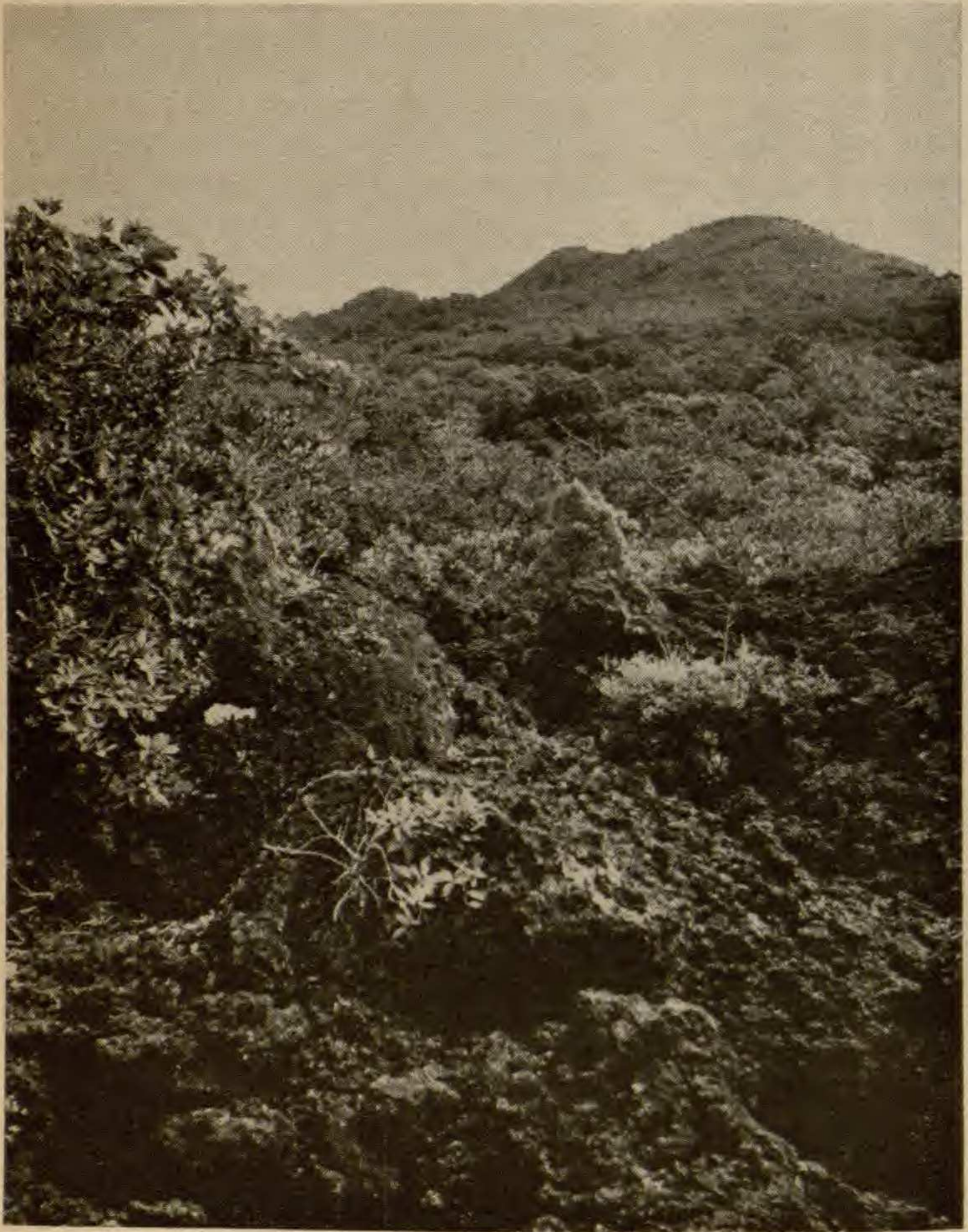


RANGITOTO ISLAND, AT ENTRANCE TO AUCKLAND HARBOUR, ABOUT 3 MILES  
WIDE, 854 FEET HIGH, AREA 6400 ACRES. PHOTOGRAPH BY L. H. MILLENER

*Mecodium dilatatum* (A. Rich.) Copel. with its large bright green frond. This species is a tree climber, and so also is the occasionally met Hairy Filmy Fern, *Mecodium scabrum* (A. Rich.) Copel., with its rather bristly stipe and dark dull green frond, and less commonly, the finely cut *Meringium multifidum* (Forst.) Copel. with serrate edges. Occasionally, *Mecodium demissum* (Forst.) Copel., one of our larger filmy ferns, is also met. Smaller fry are not entirely absent though not common. Here and there we find the little dull green *Hymenophyllum revolution* Col. (long confused with the widespread Tunbridge fern, *Hymenophyllum tunbridgense*), the rather yellow-green fronds of *Mecodium flabellatum* (Labill.) Copel. and the small greyish-green *Mecodium rarum* (R. Br.) Copel.

But although the filmies are the most astonishing of its ferns, Rangitoto yields many others of great beauty and interest. Most attractive is the common *Microsorium diversifolium* (Willd.) Copel. with its shining bright green pinnatifid fronds often bearing large bright brown or orange sori. It climbs most energetically over rock and tree by means of its fleshy green rhizome, "spotted like a snake" owing to the presence of the black appressed scales. Of similar habit and catholic tastes is the little *Pyrrosia serpens* (Forst.) Ching, but its rhizome is more slender and its simple fleshy fronds have a whitish or buff coloured tomentum on the under side.

That large, complex and fascinating genus *Asplenium* is represented by four species. The beautiful tufts of the glossy bright green, simply pinnate fronds of the Shining Spleenwort (*Asplenium lucidum* Forst.) are to be seen, large and luxuriant in the shade and smaller, tougher and more yellowish-green in exposed places. The tufts of *Asplenium falcatum* Lam., also with simply pinnate fronds, are found in somewhat similar situations. But perhaps most fascinating of all is the Hanging Spleenwort, *Asplenium flaccidum* Forst., a most puzzling compound species which still poses many problems for the systematist. Much work has been done on it by the late David Knowlton, who was engaged in carrying out a detailed study



AN ISLAND OF VEGETATION, SHOWING SOME OF SURROUNDING LAVA FIELD  
AND CONSOLIDATED FOREST ABOUT BASE OF THE CONE. PHOTOGRAPH BY  
L. H. MILLENER

of the New Zealand *Aspleniums* when he so tragically lost his life while fern hunting on the Little Barrier Island, Hauraki Gulf. The Hanging Spleenwort on Rangitoto seems quite normal, though as always varying greatly according to situation. In the forest it sends down long, pendent, thick fronds rather like green leather, sometimes reaching five feet, but when on the rocks it produces smaller stiffer tufts of a rather yellowish-green. The Hanging Spleenwort apparently hybridizes with several other species with considerable enthusiasm, but on Rangitoto I have only ever encountered one plant that looked at all suspicious.

The common bracken, *Pteridium esculentum* (Forst.) Diels, is encountered here and there, but as there is no room for it to run it presents a somewhat disgruntled appearance. Much more at home is its not distant relative sometimes called Trembling Bracken or Shaking Bracken, *Pteris tremula* R. Br., which, in spite of its timorous name, is hardy, and sends up its tall rather light green tufts of fronds in all sort of odd attractive corners. The more beautiful *Pteris macilenta* A. Rich. has also been encountered but only rarely. One might also see occasionally, though only where its rhizomes have room to run, the somewhat sticky Scented Fern, *Paesia scaberula* Kuhn, whose sun-loving tastes and exuberant growth make it extremely unpopular with the New Zealand farmer.

If one investigates suitable rocks where humus has accumulated in the crevices, two small Rock Ferns *Cheilanthes Sieberi* Kunze and *C. distans* R. Br. will be found. They are only a few inches high and are not at all easy to distinguish when mature, but the unrolled fronds of *C. distans* are very hairy giving a "cottonwool" effect to the young crook. Another Rock Fern rather larger and with a simply pinnate frond and rounded pinnae is *Pellaea rotundifolia* Hook., well calculated to make the most of unpromising situations. *Doodia media* R. Br., another fern loving the open spaces, also has a two-ranked frond, which when young has beautiful autumn colouring. Also to be seen on Rangitoto is our sole New Zealand member of the Comb Fern

genus, *Ctenopteris* Blume. Our little New Zealand Comb Fern, *Ctenopteris heterophylla* (Labill.) Tindale, is a tough little tufted fern with deeply pinnatifid fronds. Two more little epiphytic tufted ferns are *Grammitis Billardieri* Willd. and *Anarthropteris Dictyopteris* (Mett.) Copeland. Both are sometimes to be found on rocks and tree trunks and have small undivided fronds. The *Grammitis* is rather an insignificant little thing with rather dull green fronds and not common. *Anarthropteris* on the other hand has long rather bright green fronds and is moreover stoloniferous, and so if it finds a suitable tree trunk or rock face can cover considerable areas. It is not particularly common on Rangitoto as it likes a certain amount of shade. The exact systematic position of this monotypic genus has been a matter of earnest debate among pteridologists. It has on occasion even been included among "jointed ferns" to the dismay of Copeland who very firmly named it *Anarthropteris* (an, not, and arthron, a joint) so that such unseemly errors should not again be committed.

A few odd species will crop up where the land has become more consolidated and more soil has collected. Two maidenhairs, *Adiantum affine* Willd. and *A. hispidulum* Swartz, have been recorded, and also a tree fern, *Cyathea dealbata* (Forst.) Swartz, and Shield Fern, *Polystichum Richardii* (Hook.) J. Smith, but these are not characteristic.

I feel I cannot conclude without some word of the "hidden ferns" of Rangitoto, which are a never-ceasing source of wonder to the visitor. One pursues a track through forbidding masses of black brittle lava rocks some quite small, some large or forming slabs, part of the cooled surface of the once molten flow, an area seemingly of complete and barren devastation. But if one steps aside on to the treacherous lava—carefully for it has an unmannerly habit of giving way and badly scored ankles are not hard to acquire—then bends down, moves aside a clump of rock, and peers into the miniature cavern below one will be astonished at what is seen. First is noticed the delicate green fronds of the Necklace Fern, *Asplenium flabellifolium*

Cav., which sends its little simply pinnate fronds from rock to rock; on finding suitable substrata these fronds will root at the end and continue on their fragile way. Tiny clumps of filmy ferns, probably *Mecodium sanguinolentum* (Forst.) Copel. may be encountered; the clump will never extend very far, but it is amazing to find it there at all. Liable to be found also are small plants of Shining Spleenwort, Hanging Spleenwort, and *Asplenium falcatum* Lam., and the Trembling Bracken may also put in an appearance. These ferns are not likely to grow very large and indeed some may not survive at all when they grow out into full sunlight. But they will gradually add their modicum of humus and in the meantime are a lasting source of delight to the wandering botanist.

Other areas in New Zealand may be found rich in the number of fern species but I know of no other spot that can rival Rangitoto with a fern wealth that is at one so beautiful and so entirely unexpected.

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### **Feeding Hardy Ferns: Wise, Safe, and Risky Methods<sup>1</sup>**

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The majority of our members are experienced cultivators of ferns who require no instruction from me, but so often, when friends have seen my ferns in their full dress, the question has been asked, "What do you feed them on?" that I am daring to place my views on the subject before readers in order that they may pull them to pieces, ruthlessly, if they wish, so long as they will offer alternatives from which we may all learn something.

Ferns, hardy or exotic, do not relish rank animal manure. That much I proved in the early days of my horticultural career, when I ruined a batch of several thousand market ferns by mixing cow and horse manure in the potting compost. I have since witnessed the torture and piecemeal murder of a plantation of hardy ferns which a gardener of the know-all type in-

<sup>1</sup>Reprinted from the British Fern Gazette, by permission.